A STUDY OF THE INCIDENCE OF AN INCREMENT VALUE LAND TAX

SUMMARY

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I. General Considerations

From time to time suggestions are heard that increment value land taxes, copied like fashions in dress from European models, should be introduced in the United States. The aim of the proponents of these measures is usually to bring about some changes in land-holding, such as, to discourage large holdings, to encourage small holdings, to force more land into cultivation or use, or to penalize speculation in land. Thus a recent report says: "The increasing difficulty and hardships attendant upon the attempts of individuals of small means to procure, retain and develop a reasonable land-holding for farm, residential or business purposes, and the continued holding of land values in large ownerships in this state indicates that something is fundamentally wrong with our land economies." It further urges that: "the private ownership of large holdings of land unimproved and uncultivated is . . . against the public interest"; that: "the accretion of value thereto . . . is also against the public interest"; and that: "every man has the right through his labors to a reasonable living from the land." A bill accompanying the report, and intended to carry out its ideas, provides for the exemp-

tion, from certain proposed "excess value" taxes, of $5,000 worth of land for each resident holder "in recognition of the right of every individual to own a home and to obtain sustenance from the land," and then imposes: (1) an annual tax on the future increase in value of all holdings over the exemption, and (2) an additional annual tax on the increase in value of such land as is not "beneficially used."[1] It would be difficult to find a better illustration of the intermixture of ideas back of such proposals.

Even tho most of the proposed increment value land taxes are aimed at social and economic reforms, and their proponents are therefore prone to look upon them as lonesome taxes, independent of all others, yet such taxes will, if ever enacted, fall into place with other taxes and affect the balance and the incidence of the whole revenue system. Land is everywhere subject to taxation, in some form or other, and the new tax thereon finds one or more others in possession when it arrives. In the United States the tax burdens on land are already very heavy and on that account the question of the probable incidence and effect of an increment value land tax would be peculiarly important. Moreover, the realization of the hopes for "reforms," or changes intended to be such, must also depend very largely on the incidence and influence of the new tax in the environment into which it may come.

It seems worth while therefore to review and restate the theory of incidence in special application to this type of tax. The general principles involved are well established and familiar. Nothing new on the theory of incidence is advanced in this study. All that is attempted is to apply the familiar principles to a special

[1] Report of the Special California Tax Commission of 1917, pp 99 ff, and Assembly Bill No. 1171, session of 1917, California Legislature

problem, in as simple a way as possible, with the further idea of presenting a method so simple that anyone can apply it to test out the probable incidence of any proposed increment value land tax.

Taxes transplanted from one place to another do not always stay true to type. Thus the effects of increment value land taxes in Europe are in several respects different from the effects which the introduction of a similar tax in the United States would bring about. In a general way it may be said that when such taxes have been introduced in Europe they have been fitted into the existing tax system in order to reach a source of revenue, a type of property or of income, which it was held the other taxes did not adequately reach. Thus, for example, when Lloyd George proposed this form of taxation, it could, perhaps, be urged that land was not being adequately taxed. The old land tax, in so far as it had not been redeemed, was a fixed charge, like a rent charge, and did not vary with income or values. Altho the local rates were measured by the annual rents paid for houses and lands, they were paid by the tenants and, altho undoubtedly largely shifted to the landlords, did not openly appear to come from them. The inhabited house duty was also measured by annual value. In the same way, altho the income tax included income from land, it did not include the increase in the capital value of the land, which might be construed to be a form of income slowly accumulating and eventually collected. There was no tax based on the capital value of land, except the estate duty. That was not payable until the owner died and rested on a very different justification from other taxes. There was thus an apparent gap in the system which the increment value land tax might be held to fill. There was no need of an appeal to other than fiscal reasons for its imposition.

But in the United States the general property tax picks up the increment in land value as fast as, or nearly as fast as, it arises, and levies upon it as heavily as upon any other form of property. The increment is taxed, is taxed annually, and taxed very heavily. When land is unused the present capital value of expected future income is taxed often long before the income accrues. A special increment value land tax would, therefore, only stress a heavy burden already imposed on the same source. Moreover, the burden which the general property tax imposes on the increment is much heavier, in parallel cases, than that which is imposed by the specially designed increment value land taxes of other countries.

II. Analysis of the Effects of an Increment Tax of the British Type

To illustrate the principles involved, to give this study a specific content, it has seemed well to select some one definite form of an increment value land tax and study that. By so doing it has been found possible to shorten and simplify the presentation. It is believed that the method of analysis here used can be applied to any other increment value land tax with only such changes as the differences in rates and in the exemptions may make necessary in the numerals. The type of increment value land tax chosen is that of the British, imposed by the " Finance (1909–10) Act, 1910."

Omitting many details, important in themselves but not significant for our present purpose, this tax may be briefly described as follows. First, there was prepared a new " doomsday book " in which was entered the newly ascertained capital value of all land in the United Kingdom, as of a given day. Agricultural land was in-

cluded altho exempt from the tax as long as it remains agricultural land. The value taken was the capital value of the site alone, stripped of the value of anything that had been done to it by man. The value ascertained and entered in the doomsday book was called the " original " value. Whenever, thereafter, the land is sold, or passes to others on the death of the owner, it is revalued in the same manner as before. The new value is called the value on the " occasion," that is, on the occasion for the imposition of the tax. If the value on " occasion " exceeds the " original " value, the excess, or the increment, is taxable. But not all of it is taxed, there being deducted from the increment an amount equal to 10 per cent of the " original " value. The rate levied on the remainder is one-fifth. Thus the tax is one-fifth of the difference obtained by subtracting from the value on " occasion," if it be sufficiently the larger, 110 per cent of the " original " value. If the value has decreased, or if the increase does not exceed 10 per cent of the " original " value, there is no tax. When a subsequent sale or transfer takes place the value on the next preceding " occasion " is treated as the " original " value, and the tax is computed in the same manner as before.[1]

The theory of incidence used in this study is the generally prevailing theory of the incidence of all permanent land taxes, namely, the amortization theory. This theory is adopted without attempted proof other

[1] A very complete description of this tax, and of the other new taxes associated with it, is to be found in Napier, " The New Land Duties," and another in Devonshire and Samuels, " Duties on Land Values " It is hard to say which of these two admirable treatises is the better A brief account of these taxes, prepared by the writer of this study, is to be found in the Report of the State Tax Commission of the State of California, 1917, pp. 131 ff. (This was a temporary commission) A limited number of separate reprints are available At the beginning of the war these land duties were suspended, because the yield was as yet small, the expenses of administration were very heavy, the administrative staff was depleted by recruiting, and many of the owners from whom returns were needed were at the front

than that which is afforded by the fact that in this specific instance it affords a satisfactory explanation of the observed facts.[1] In accord with this theory it will be held that any permanent land tax makes the government a silent partner, as it were, in the land and causes at once a decrease in the present value of the active partner's share, that is of the private owner's share, or his property right in the land, equal in amount to the present value of the future tax payments, regarded as a series of payments, in so far as this series of payments can be foreseen, at the time of the imposition of the tax. But in so far as the tax may eventually be levied upon increments which are not foreseeable before they arise it has little effect on the capital value.

Every increment value land tax obviously predicates two values in the land. One is the present value, the other the future increment in value. But on closer analysis the present value in turn is found to contain two elements. One of these is the capitalized value of the income that is now being realized, or which could be realized now, by the use of the land in so far as that income is regarded as permanent, and the other is the present value of such additions to the income as are, at the present time, confidently expected to arise in the future. These are the two more or less certain factors in the value. But there is also another element which has been very aptly called the "windfall" element. There may be, some day in the future, additions to the real or potential income which are not now distinctly foreseeable. They may be vaguely and pleasantly hoped for, but save as they add to the optimism with which land investments are regarded they add nothing definite to the present value. The increment value tax

[1] In large part the method of treatment was suggested by Professor Pigou's letters to the London Times, 1910, and by the article in the Economic Journal, June, 1913, by Stamp.

when paid will fall on two elements in the value at the time it is paid. One of these is represented in the present value, in discounted form, the other, the windfall element, is barely perceivable in the present value. In passing it may be noted that the arguments by which the increment value land tax is supported are often of such a character as to lead one to suppose that the intent is to tax only the windfall element. But no increment tax in operation ever does this. In fact if the increment were entirely uncertain, and could not be "expected" by the owner, it is hardly likely that the government would think it worth while to "expect it" even to the extent of levying a tax on it.

Altho, as just stated, we can make no numerical calculations with regard to the increments in land value, or taxes thereon, that are not now foreseeable, there is nevertheless a probability that the tax on the unforeseeable will cause a slight depression in the present value of the land, because of the optimism which the possibility of such a windfall creates, and of the lessening of the optimism by the tax. If the chances were exactly even for a decrement or an increment there could be no evidence of the windfall value in the present value. But it is idle to deny that in new countries, and everywhere in connection with land near rapidly growing cities, the business world assumes that the chances of an increment are better than the chances of a decrement. This amounts to saying that the unforeseeable is treated in part as foreseeable. This is one of the elements accounted as part of the margin of safety that makes land such a favorite investment. In all this there is no intent to deny that an increment value tax in so far as it falls on an absolutely unexpected windfall is born solely by the recipient of the windfall. Nevertheless by far the greater part of such a tax is on the expected increment.

In this connection it may be well to point out that if the new taxes lessen the optimistic attitude toward land investments they may lessen the demand for land. Such a falling off in the demand for land may produce a greater proportionate fall in the capital value of land. This is somewhat analogous to Gregory King's law, altho that law relates primarily to consumers' goods and not to producers' goods or to land.

We speak of these taxes as increment "value" taxes, and we must continue to do so since they are so designated in the laws. But the name is a misnomer. Strictly speaking they should be called "price increment" taxes. In so far as any of these taxes have been in force during the past twenty years, during which period the purchasing power of money has steadily fallen they have been levied in no small part on increments in price that correspond to no changes in value. It is a misfortune of increment value land taxes that they do not run true to name or purpose. They are distinctly frauds so long as the purchasing power of money is falling and self-defeating when it is rising. Thus if there had been such taxes in force in the United States during the Civil War period we might have had a result somewhat like this: a piece of land which sold in 1860 for $1,000 in gold, might have been sold again in 1864 for $2,500 in greenbacks, and been taxed on the basis of a $1,500 increment, the tax being a very real burden; then it might have sold again in 1878 for $1,000; and all this might have happened without any perceptible change in the use or demand for that land during the eighteen years. It is interesting to note that in contrast to this obvious perversion of purpose one may set the general property tax which applied in the same period to the same land, with only such changes in rate as the needs of the government dictated, would have

taken approximately the same proportion of the price and value alike all the time. A change in price resulting from a fall in the rate of interest would also give rise to an apparent increment and might involve a tax that was not within the intent of the law.

Before proceeding further one more generalization may be permitted. It has sometimes appeared to the writer that far too much is demanded of the theory of incidence. When we have traced the final incidence of any tax we have done nothing more than to find the back that bears the burden and the amount of the burden. Whether that back is the one that ought to bear it, whether it will bend or break under the particular burden found, or whether it be one that can carry that burden comfortably, these are all questions not answered at all. They relate to other and much larger issues, issues that are most vital. The determination of the incidence is a part, and possible a small part only, of the diagnosis of the effects of taxation. In what follows we shall not attempt particularly to study the ultimate effects on the general welfare of society of these or other land taxes. But in passing it may be stated that it is the conviction of the writer, contrary to the views of Henry George and others, that excessive taxes on land, in their ultimate effects, so check the production of food, when imposed on rural lands, and so hamper industry and trade, when falling on urban lands, that they discourage effort, materially reduce the social dividend and incidentally reduce the ground rent from which they themselves are taken. The so-called unearned increment so far as it can be anticipated is a part of the normal return to workers on and investors in land. If the silent partner, as Marshall calls the government, takes too much, the working partners, the owners, will be discouraged and may fail. This is true

even when the taxes have been as it were written off by amortization. But these again are matters beyond the scope of this study.

For our purpose the essential features of the increment value land tax are: (1) that it falls on the increase in the capital value only; (2) that it is not levied annually, or at any regular interval, but only at irregular intervals of time, when some " occasion " such as a sale, or transfer on account of death, gives a definite opportunity for the determination of the increase in value. The fact that during the interval of time between " occasions " the owner is left in undisturbed enjoyment of the entire income from the increment, as well as from the original value, is the characteristic feature of these taxes, and differentiates them from the " single tax " and from any property, income, or other regular, or annual tax falling on the land, or on the increment. Thus, for example, under the general property tax the the owner is forced to share the annual increment value, the increase in rental, each year with the government as it arises. Under the " single tax " he would not have any enjoyment of the annual increment value.

By a simile, which may, however, be easily overworked, one may say that the property tax makes the government a permanent partner with the private owner in the land, while the increment value land tax makes the government a contingent heir to a part of the value. Thus an increment value tax, calculable in advance, is for a person who contemplates preserving his estate intact, an insurable risk, like an estate duty. But the property tax being a loss certain, both as to time and persons, is not such a risk.

III. Numerical Illustrations of the Results of this Type of Increment Tax

In any evaluation of the incidence of an increment value land tax we have to use definite figures, one for: (1) the rate of increment in the value of the land under consideration, and another for: (2) the interval between occasions. For the first we cannot in our problem use an average. For if rent is " the value of a differential advantage," then an average of the increments, even if we left out the decrements, as the tax does, would be, statistically, a meaningless numeral, save that it might have a use in giving the government a clue to the possible revenues. From the point of view of the individual tax payer all that can be considered is how much his land, not all or other land, is likely to increase in value and hence what the tax will be.

What we seek, then, is a method that will permit of the use of any rate of increase in land value. In the examples which follow, which have been more or less arbitrarily selected, to show the method by illustrative applications, we have assumed that a given piece of land increases in value: (1) slowly, by 10 per cent once every seven years, and (2) rapidly, by doubling every seven years. The assumption of a regular and periodic increase is made merely for the sake of simplicity in the illustration. An irregular, jumpy increase if such be anticipated can be treated just as well by the same method. No particular significance attaches to the choice of a seven year interval for the readjustment of rents. Any of the other intervals common in leases would do as well. But the assumption of seven years was suggested first by the common rule o' my thumb of real estate dealers in California that " it will not pay to

hold land unimproved unless it doubles in value every seven years." [1] It was further suggested by the fact that seven and multiples of seven occur frequently in the terms of British leases. We might smooth out the increase and assume that it accrued regularly throughout the period instead of in a lump at the end. But what might be gained in prettiness of formula would be accompanied by a loss in getting away from the facts of business life. The assumptions made correspond to things which do actually occur sometimes.

In like manner the choice of an interval between "occasions," to be used in the examples, must be a matter for each individual land owner to decide for himself as related to the effect of the tax on his land. If he is holding land to sell, he would calculate the interval on the basis of his expected turn-over period. If he is holding the land as part of his estate for his heirs, the interval to be considered has some relation to his expectation of life. The British act contains certain provisions which seem to imply that it was anticipated that there would be an average interval between occasions, or at least between unavoidable occasions, of something less than thirty years.[2] So in our examples we have chosen the nearest multiple to thirty of our seven year interval between revaluations, namely twenty-eight years.

There is one other important assumption that we have had to make to obtain definite figures for our illustrative examples and that concerns what the English economists who have written on this subject have

[1] The rule seems to be based on the assumption that the investment should earn 10 per cent, compounding to cover interest, taxes, expenses, and a profit

[2] For an interesting summary of the views of many statisticians as to the proper "multiplier" to be used in ascertaining the total heritable wealth of a country, from the estates paying the estate duty each year, see Stamp, British Incomes and Property, pp. 407 ff.

called the " business horizon " in time. There seems to be a general acceptance in the business world of the idea that land values cannot go on increasing forever, or, if not that, an acceptance of the idea that very remote increments are too far away to be reflected in any present values. Practically there is a limit of vision, or an horizon in time, as to the increases in land values which anyone is willing to take into consideration and pay for now. This does not rest solely on the fact that very remote payments have little present value. The present value of a payment to be received a thousand years hence is very nearly nothing by strict calculation. But the business man is too nearsighted to see as far as the mathematical vanishing point. His vision has a vanishing point that is but a very little way off. We have chosen as the " horizon " in our examples a point of time twenty-eight years hence.

A word of warning must be sounded as to the substitution of other figures and that is that the " horizon " may not safely be placed very far away in the future. This is because the formula underlying the computation shows an uninterpretable infinite value if we assume that the increment goes on forever, provided, the rate of increment taken be one which is more rapid than the increase by interest, compounded, at the rate chosen for capitalizing the rents. In fact, generally speaking, the numerical results obtained by using a distant horizon are of no more practical value than those which are obtained by calculating, for example, how much a penny would amount to at compound interest since the time of our Lord.

There is still one other feature of these taxes that we must bear in mind and that is that on account of the exemption of a part of the increment, the exemption being measured in terms of the original, or last preced-

ing, value, the shorter the interval between occasions, other things being equal, the less the tax, and conversely. The nimble land speculator, turning his land over at short intervals avoids all these taxes. Yet this, or its equivalent is the only form in which a real exemption can be granted, for any exemption computed on the increment itself is, in effect, merely a change in the rate.

As our first illustration, or example, we may take the case of a landowner who confidently expects that his rentals will increase by 10 per cent (compounding, as it were) at the end of every seventh year. He does not at present intend to sell his land but to hold it as part of his estate, and hence assumes that the tax will be paid on the occasion of his death which, according to our assumption, as above explained, he sets down as likely to occur some twenty-eight years hence. If he does sell before that time the tax will be less, provided his estimate of the future prove correct, or he will sell in order to harvest some "windfall" which is, of course, a matter on which no one can calculate. Let us assume further that he reckons interest at 4 per cent, and makes his calculations on the basis of one dollar a year rental from the site value of the land. He might, then, be supposed to calculate somewhat as follows:

"I am to receive (*a*) \$1.00 a year for the first seven years; then (*b*) \$1.10 a year for the second period of seven years; then (*c*) \$1.21 a year for the third period of seven years; then (*d*) \$1.331 a year for the fourth period of seven years. At the end of the twenty-eighth year I shall pass on a property yielding (*e*) \$1.4641 a year and worth then, as a perpetuity, \$36.60. The rentals may continue to increase after that, but twenty-eight years is a long time and I cannot now bank on any further increase. But it is practically certain that at

the end of the twenty-eighth year my estate will have to pay a tax on the increment. This tax will be equal to one-fifth of the difference between the future value $36.60 and 1.10 times the present value." How will he determine the effect now of that tax to be paid twenty-eight years hence?

The present value at 4 per cent interest of the series of annual payments (*a*), (*b*), (*c*), and (*d*), above set down, assuming them to be received each at the end of the year, together with the present value of (*e*) the $36.60 to be received twenty-eight years hence, is $30.924, disregarding the effect of the tax.[1] The future value of the land, namely, $36.60 will be in no way affected by this tax, altho it may when the twenty-eight years roll around be affected by some future tax then foreseeable. But if there is to be a future tax of the same character as this one, there will be a future increment then foreseeable and we would have a different value for the land unaffected by the tax, since the value of the new increasing series of payments will be greater than $36.60. The possibility of getting more than $36.60 twenty-eight years hence is a gamble, which is beyond the horizon now. All that can be definitely considered now is that $30.924 is the present value of the land, if there were no tax. But this sum will be reduced on account of the anticipated tax by the amount which if put at interest will equal the tax in twenty-eight years; or, what amounts to the same thing, we might consider each of the payments in the series reduced by

[1] At the risk of explaining what may be obvious, we may say that at 4 per cent this $30.924 is the sum of the amounts which put at interest today will equal $1.00 a year hence, $1 00 two years hence, $1 00 three years hence, and so on for seven years, plus the sum of the amounts which put at interest will equal $1 10 at the end of the eighth year, the ninth, etc , and so on for each of the four periods, together with the sum which put at interest today will equal $36 60 twenty-eight years hence. Since any sum put at interest at 4 per cent will very nearly treble in twenty-eight years, the sum necessary to put at interest today to amount to $36 60 in twenty-eight years is about $12 20.

the premium necessary to insure against the loss, that is the tax, to occur twenty-eight years hence. That sum at 4 per cent interest is about one-third of the tax. Hence the present value that we are seeking is \$30.924 less one-third of the tax. We have then two unknown, but related quantities, the present value and the tax, and two known quantities, the present value unaffected by the tax, or \$30.924, and the future value, or \$36.60. Let us call the unknown quantities x and y, in the order named. Then we can set up two equations: $x = \$30.924 - \frac{1}{3}y$; and $y = \frac{1}{5}(\$36.60 - 1.10\, x)$. Substituting and solving we find $x = \$30.74$ or the present value: and $y = \$0.557$, or the tax, the present value of which is \$0.1856.[1]

[1] It may be of interest to present the formula in more general terms The general principles are those for computing investment values, which are to be found in such texts as Skinner's Mathematical Theory of Investment, and others

We start with the problem· to find the present or capital value, at a rate of interest i, of an income which is periodically increased at the rate k Let the income increase at the end of every nth year. Assume all incomes to be paid at the end of the year

The value of an income of \$1 00 per annum for the first n years is $v + v^2 \ldots v^n$ During the next n years the income is $1 + k$ and the value is $(1+k)\,(v^{n+1} + v^{n+2} \ldots v^{2n})$. In the third period of n years the value is $(1+k)^2\,(v^{2n+1} + v^{2n+2} \ldots v^{2n})$ and so on

The total income is then: $V_1 = (v + v^2 \ldots v^n) + (1+k)\,(v^{n+1} + v^{n+2} \ldots v^{2n}) + (1+k)^2\,(v^{2n+2} + v^{2n+2} \ldots v^{3n}) \ldots$ etc.

Taking out the factor $(v + v^2 \ldots v^n)$ we obtain a series in geometrical progression, like $1 + a + a^2 \ldots a^n$, the sum of which is $\dfrac{1 - a^{n+1}}{1 - a}$.

Now if a is less than unity the limit of this sum, as n approaches infinity, is $\dfrac{1}{1-a}$ and must always have a finite value, but if a is greater than unity the value is infinite.

It follows that when k per annum is less than i per annum, the series, assuming the increase in value to continue forever at the same rate, has a finite value, which is:

$$(v + v^2 \ldots v^n)\left(\frac{1}{1 - \dfrac{1+k}{(1+i)^n}}\right).$$

But if the assumed increment k to be added at the end of n years is so large that it exceeds the accumulated interest at the rate i for n years, the value of the sum of the series is, under the same assumption as before, infinite.

In any practical problem, one would use only a part of the series up to the year of the first occasion for the imposition of a tax, or the year, m, or else up to the year of an assumed horizon, h. That being the case knowledge of the formula for the limit of the sum when n approaches infinity, is of little assistance for abreviating the work, which can, of course, be easily done by the help of interest tables.

The solution after V_1 is obtained is as follows. One computes also the value of V_2, or that of a similar series beginning at the date of the first occasion. Then:

The reduction in the present value caused by the tax is, in this example, six-tenths of one per cent of the value unaffected by the tax.

Of course, a 10 per cent increase every seven years is not a very rapid rate of increase. Let us therefore try the same problem with the assumptions otherwise the same, but using an increase of 100 per cent every seven years, which is possible in certain localities. The results obtained are, for the present value as depressed by the tax \$169.18. The value untaxed would be \$183.45. The tax would be \$42.78, which has a present value of \$14.26, and the reduction caused by the expectation of the tax is 7.77 per cent of what the value would be if there were no increment value tax.

These two illustrations may suffice to show the method. They also show that the calculable effects of the tax on the present value are not very great, even when the rate of the increase in value is very rapid. What causes so much alarm when such taxes are proposed is doubtless to be found among the non-calculable factors. Perhaps it lies even more in the possibility of other and more severe taxes on land and the evidence of a possible intention to make a fundamental change in the institution of private property in land.

Let X = the present value as affected by the tax. Let T = the tax; r = its rate, e = the exemption; and m the year of the first occasion

$$\text{Then } X = V_1 - \frac{T}{(1+i)^m};$$

$$\text{And } T = (V_2 - (1+e)\,X)\,r.$$

$$\text{Hence } X = \frac{V_2 - \dfrac{rV_2}{(1+i)^m}}{1 - \dfrac{r(1+e)}{(1+i)^m}}$$

IV. Comparison with the Results of the General Property Tax in the United States

We may now proceed to make a numerical comparison of these results with the effects of the general property tax in parallel cases. In doing so we must bear in mind certain propositions relating to the increment value land taxes which have been stated above. These are: (1) If there be an exemption in the form of a percentage of the base or original value, the more frequent the "occasions" the less the revenue obtained by the government. (2) Even if the tax is 100 per cent of the increment and there be no exemption allowed it will not wipe out the entire present value of the increment regarded as the property of the owner, because the tax is not payable for years to come, and in the meantime the owner has the use of the increases in the rentals. Thus even in our second example where the increase is rapid and the tax large, a tax at 100 per cent of the increment, and with no exemption, would still leave a present value of $75.10 for every $1.00 of present income (as against $183.45 untaxed) of which $55.10 is attributable to the enjoyment of the increment in the interval before the tax is to be paid. (3) The tax receipts will necessarily mature very slowly, and will come in very irregularly.

The tax receipts and values under the general property tax on the two pieces of land used in the two examples may now be stated. In the first example, we assumed a piece of land increasing in value at the rate of 10 per cent at the end of each period of seven years. If the rate of the property tax be assumed to be one per cent on the capital value of the owner's interest or share, and that value be taken to be twenty-five years

purchase of the ground rental less the tax, then the government has a permanent share always equal to one-fifth in the property. The original \$30.924 which we found above, or the value of the land per \$1.00 of present income or ground rent, is thus divided and the share of the owner is \$24.739, while that of the government is \$6.185. The owner's share in the increment alone has a present value of \$4.739 (\$24.739 − 20) and the government's share in the same, a present value of \$1.185 (\$6.185 − 5). It appears, then, that the government's share under the general property tax, or \$1.185, in the increment alone is six and four-tenths times as large as it would be under an increment value land tax of the sort used in our example, which in the parallel case was \$0.1856.

Again applying the same method to the second example the present value of the two interests combined is as before \$183.45. The private owner's share is \$146.76 and the government's share, through the general property tax, \$36.69. The owner's share in the increment alone, has a present value of \$126.76 and the government's share has a present value of \$31.69. The latter is two and two-tenths times the present value of the government's interest under the increment value land tax which was found above to be \$14.26.

The comparison here instituted is kept strictly to the effects on the increment values only. There is of course the further effect that the property tax depresses the original value disregarding the increment. This is important if we anticipate that the rates of the general property tax will increase, for the value of the original investment is often large as compared with the increment value. It may be objected that we have used a fairly stiff rate for the general property tax, but since the differences found are so large the main statement

that the general property tax is likely to impose a larger burden on the increment than the increment value tax alone is still true, even at lower rates, within reason, for the property tax.

Summarizing the results and adding the effects of combining both taxes we have the following:

EXAMPLE I. LAND VALUE INCREASES 10% EVERY SEVEN YEARS

Value of the land, untaxed, per $1.00 present income......	$30.924
Value of owner's share under the increment tax only	30.74
Value of owner's share under the property tax only	24.739
Value of owner's share under both taxes combined	24.592
Value of government's share, increment tax only........ ..	0.1856
Value of government's share, property tax only...........	6.185
Value of government's share, both taxes combined	6.332[1]

EXAMPLE II. LAND VALUE DOUBLES EVERY SEVEN YEARS

Value of the land, untaxed, per $1.00 present income	$183.45
Value of owner's share under the increment tax only	169.18
Value of owner's share under the property tax only	146.76
Value of the owner's share under both taxes combined	132.34
Value of government's share, increment tax only	14.26
Value of government's share, property tax only	36.69
Value of government's share, both taxes combined	51.11[1]

We have now finished the task we set ourselves and found the back that bears the burden, and how to measure that burden. The far greater task of interpreting the results in terms of social and economic well-being remains for others or for some future effort.

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[1] The third figure in each example for the government's share is not the sum of the two above it, because the general property tax alters the relation between the present and the future values after deduction of the 10 per cent exemption so that the proportion of the increment value tax is different.